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New Fossil Coleoptera from the Florissant Beds

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New Fossil Coleoptera From the Florissant Beds

Twenty-one species are described as new in the following pages. The Florissant list of Coleoptera now reaches a total of five hundred and fifteen, and while no new families are added several of the genera are either established as new or have not before been recognized from these deposits. Work on the available collections is now approaching completion and the ancient Coleopterous fauna of these Miocene shales may be considered as fairly well known.

It is quite within the bounds of probability that another year will see the publication of an analysis of the fauna which will allow of fairly accurate comparisons with local lists from various sections. Meanwhile it will not be altogether without interest to make a few general remarks as to the nature of the beetle life around the ancient Lake Florissant, as shown by the numerous collections, aggregating several thousand specimens, which have been studied by Scudder, Cockerell and myself.

Perhaps the most evident feature is the inconspicuousness of the majority of the species. It is true that a few large beetles occur, such as an occasional *Calosoma*, a *Lucanus*, a *Strategus* and so on, but there is nothing like the number of striking forms that one would expect when comparing the Coleoptera with the Mammalian life of the same period. In Iowa, California, New York or Canada, one might find in a single day more really fine beetles than are represented in the whole list of the Florissant fauna. There are no *Pasimachus*, *Dytiscus*, *Hydrophilus* (proper), *Necrophorus*, *Al-*

aus, Chalcolepidius, Chalcophora, Polyphylla, Cotalpa, Prionus, Monohammus and the like, among the hundreds of fossil species. Nor, in general, do we find evidence of much of the exaggerated specialization which gives variety to the study of recent forms, even from the more temperate climes. The natural and perhaps too obvious conclusion would be that the Coleoptera of this period were really much less specialized than those of today, and that the modern species of remarkable appearance, which look so out of place in our collections, are, in reality, late developments and not survivals from a past age. An alternative argument would be that the climate of Florissant during the period of shale deposition was too rigorous to allow great diversity of development in a group like the Coleoptera, which today responds so readily, with wonderful variety of form and structure, to a tropic life.

A discussion of the former thesis cannot profitably be held just now. As to the latter, it must be said that the abundance and variety of tree life, shown by plant remains, certainly indicates a mild climate, though not a tropical one. It also points to a moderate degree of humidity. Further, there is little in the makeup of the Coleopterous fauna, aside from the general tendency to inconspicuousness, to contradict the testimony of the flora. In fact there are some features, such as the enormous specific multiplication of the Curculionidae, the considerable number of Bruchidae and Rhynchitidae, the presence of types like Protapate and Chelonarium which, taken by themselves, would seem to point definitely to warmth. The matter is complicated by anomalous proportions in the representations of certain groups or families which are difficult of reconciliation with existing conditions.

One of these anomalies is well shown in the Scarabaeidae. At present, we have living in North America a very good representation of truly coprophagous genera and species, (Laparosticti), with a range as far north, at least, as the Great Lakes. As we go up the mountain sides, or to the far North, most of them disappear except the Aphodiini. But at Florissant, so far as our records show, were found no Canthon, Copris, Phanaeus, Onthophagus nor Geotrupes, genera common today in temperate climes. On the contrary, the Aphodiini were very plentiful, not in species

alone but in individuals. A second anomaly is noticed in the abundance of Byrrhidae, a northern characteristic in America nowadays, and a third is the very pronounced paucity of Chrysomelidae. Light may be thrown upon some of these problems when the Tertiary Coleopterous fauna of this country has been fully investigated. For the moment, all that can be done is to call attention to these phenomena, leaving their explanation to a fuller knowledge.

Because of the apparently close generic correspondence of the fossil beetles with species now living in North America, I am forced to believe that the insects of the Florissant Miocene stand in direct ancestral relationship to our present fauna, or that at worst they are closely collateral branches from a common stem. In most instances where the fossils are compared with modern forms, the specific affinities and the facies seem to be distinctively North American rather than European or Eurasiatic. It is presumable that North America received a large proportion of the species now inhabiting that part of the continent above the Sonoran zones from the Eurasian lands in some far distant time. It also seems likely that these immigrants would diverge more from the parental stock than those which remained in the original habitat. The Florissant fauna is sufficiently like the Eurasian of today to indicate a common general origin, but it is even more like that of recent North America and I see, at present, no reason to believe that it had been eradicated in anything like entirety, to be replaced by members of a fresh invasion from the north. The presence of a considerable number of southern types may be explained on the principle of an injection from centers of dispersal lying in that direction, or it is possible that they represent the remnants of a still more ancient fauna, occupying the Florissant site previous to the irruption of the Eurasian wave which gave the insect life its characteristic tinge.

Most of the specimens described in this article were collected by myself on the Wilson ranch, near Florissant, and the types, in such cases, are in my collection. Where another source or disposition holds, it is so indicated. All the figures are from my own camera lucida drawings on scales to suit the size or

nature of the subjects, and measurements must be taken from the text.

Arranged by families, the new species are:—

EROTYLIDAE.

Tritoma petrefacta

CRYPTOPHAGIDAE.

Cryptophagus petricola

NITIDULIDAE.

Miophenolia cilipes

MALACHIIDAE.

Malachius pristinus

PTINIDAE.

Oligomerus brevisculus

SCARABAEIDAE.

Lachnosterna (?) *extincta*

CERAMBYCIDAE.

Saperda florissantensis

RHYNCHITIDAE.

Rhynchites vulcan

Rhynchites laminarum

Eugnamptidea robusta

CURCULIONIDAE.

Apion florissantensis

Apion scudderianum

Ceutorhynchus blaisdelli

Baris antediluviana

Baris renovata

Baris nearectica

Miogernaeus recurrens

Centrinus hypogaeus

SCOLYTIDAE.

Pityophthoridea diluvialis

Adipocephalus hydropicus

Phloeotribus zimmermanni

TRITOMA PETREFACTA sp. nov.

(Plate I, Fig. 4).

Form stout, something as in the recent *T. unicolor*. Head, viewed from above, broader than long, front and vertex finely sparsely punctured. Eyes not well defined. Antennae slender basally and with the margins of the joints rather obscure, especially on the club which seems to be three-jointed, relatively longer and narrower than in the species with which it has been compared. Prothorax about two and two-fifths times as broad as long, much narrowed anteriorly, sides nearly straight, front angles acute, projecting forward, base broadly rounded, surface very inconspicuously punctured. Scutellum small but distinct. Elytra striatopunctate. Underside rather finely, sparsely and obscurely punctured except on the thoracic side pieces where the sculpture is much coarser and stronger. Legs wanting. Length 5.50 mm.

Described from one specimen, with counterpart.

Compared with the other Florissant species of this genus, the beetle is much larger than *T. submersa* and of a different shape from *T. diluvialis*. The remaining species, *T. materna*, is considerably smaller than *T. petrefacta* but on account of its being preserved in profile one cannot make satisfactory comparisons as to form. Compared with recent American species of Erotylidae, I find that *T. petrefacta* approaches *Mycotretus* and the

shorter species of *Tritoma* in form and sculpture but differs from them in having a narrower and carinate prosternum. Likely enough generic differences existed but none are available for use. The underside of the fossil shows the elytral striation, which has set through, much better than the upper. In the figure, I have merely indicated the courses of the striae by means of dotted lines and have not attempted to show the relations of the separate punctures.

CRYPTOPHAGUS PETRICOLA sp. nov.

(Plate I, figs. 1, 2).

Form elongate, subparallel. Head nearly twice as broad as long, strongly punctured, rather coarsely and closely upon the vertex, more finely and sparsely upon the front, anterior margin prominent at middle. Eyes of moderate size, coarsely granulate. Antennae with very large first joint, the second considerably smaller, third and fifth each nearly as long as the second but narrower, fourth, sixth, seventh and eighth shorter, ninth to eleventh forming a pronounced and rather broad club. Prothorax nearly twice as wide as long, punctuation about as coarse as that of the head, scattered on the disk, closer at the sides, the latter gently rounding and apparently not toothed. Elytra fully three times the prothoracic length, sides subparallel, punctuation about equal in size to that of the prothorax, not arranged in regular striae but showing some signs of serial arrangement. Beneath, head and prothorax rather coarsely and closely punctured, metathorax less so, abdominal segments nearly smooth. Length, 2.65 mm.

Described from one specimen, with which are associated two others.

Compared with the other Florissant fossil species, this is intermediate in size between *C. bassleri* and *C. scudderi* and differs from both in the antennal structure which is quite typical of recent species in the enlarged first and second joints.

MIOPHENOLIA gen. nov.

Form not very unlike that of *Phenolia*, mentum and mandibles, as far as can be seen, of the same type. Elytra nearly, if not quite, covering the pygidium. Legs stouter than in *Phenolia*, the middle tibiae rather strongly curved on the posterior margin which has a submarginal row of close, moderately long spines or stiff hairs. Elytral sculpture coarse, punctatostriate.

Type. *M. cilipes* sp. nov.

MIOPHENOLIA CILIPES sp. nov.

(Plate I, fig. 3).

Form, as preserved, a little more elongate and less parallel than in the recent *Phenolia grossa*. The specimen is exposed so as to show the underside and most of the characteristic sculptural features are therefore obscured.

Mandibles projecting, moderately long. Mentum bluntly angulate anteriorly in the middle, its face rather coarsely but not deeply punctured. Prosternum strongly separating the coxae, its sculpture and that of the remainder of the underside obscure but certainly not deep. Elytra exposed only on the edges and showing from beneath but exhibiting portions of two or three close rows of large punctures, rounded in form and separated by much less than their own diameters. Legs short and stout, the middle tibiae, which are the best preserved, each showing a row of close, rather long spines along the posterior edge. Length, 6.00 mm.

Described from one specimen.

Numerous characters are shown which point to the Nitidulidae as a family reference. These are the general form, prominent mandibles, capitate antennae (which, however, are poorly preserved), form of the mentum, position of antennal grooves, transverse front coxae separated by the moderately wide prosternum, non-truncate elytra and short legs with fringed tibiae. The beetle is above the average size of recent Nitidulidae but no larger than *Phenolia grossa* with which it has been compared.

MALACHIUS PRISTINUS sp. nov.

(Plate IV, fig. 26).

Form, as preserved, more elongate than in recent species of this genus, but from the position in which the specimen lies and the condition of the edges it is probable that the full width is not shown. Head of moderate size. Eye rather large, rounded. Antenna imperfectly preserved but showing about six rather long pectinations fairly well, from which it may be inferred that the individual was a male. Prothorax too badly crushed for description. Elytra about three and one-half times the prothoracic length, finely roughened and with some scattered punctures showing in places. Abdominal segmentation about equal. Legs wanting. Length, from front of head to elytral apex, 4.75 mm.

Described from one specimen.

Undoubtedly a *Malachius* or an allied type and, in a general way, similar to the living American forms of that genus. These very soft and fragile insects are seldom very well preserved and the present specimen is not perfect enough to allow of more specific comparisons.

OLIGOMERUS BREVIUSCULUS sp. nov.

(Plate I, fig. 6).

Form moderately elongate, the insect as a whole one and five-sixths times as long as wide. Head bent under the pronotum, front extremely minutely, closely and moderately deeply punctured and alutaceous. Eyes circular, separated by about twice their own width. Antennae not shown in detail.

Pronotum punctured about like the head except on the middle area where it is extremely minutely but distinctly and sparsely granulate, the granules scattering, not arranged in rows. Elytra evenly and minutely punctulate like the head, not striate excepting possibly one or two lines near the outer margin. Underside with small, close, vague, shallow punctures a little larger than those of the head. Legs short. Length, exclusive of extruded sex organ, 4.85 mm.

Described from one specimen with counterpart.

Compared with the described Florissant fossil Anobiinae, this beetle separates from all of them by the broad form, circular eyes and type of sculpture. As to affinities with recent forms, it appears to belong to LeConte's subgroup 2, Anobia, by the strongly deflexed head, resting upon the under surface of the prothorax. The first ventral seems not to be excavate for the reception of the hind legs, the metasternum neither excavate nor lobed in front. This is as far as the analysis can be carried through the generic table since the antennae are not well shown, but the non-clavate thighs, lack of hairy vestiture, separate abdominal segments and nonstriate elytra appear to exclude *Pinodes*, *Hadrobregmus*, *Gastrellus*, *Trichodesma* and *Nicobium*. The antennae are seen to lie on the front coxae, which are contiguous or nearly so. My opinion, therefore, is that the beetle belongs with *Sitodrepa* and *Oligomerus*, agreeing with them in the large eyes, as well as in the other characters noted. It differs from *Sitodrepa* in having the middle coxae absolutely contiguous, but agrees with *Oligomerus* in that particular. The finely punctate non-striate elytra, however, are foreign to the latter genus, as far as my experience goes. Relatively to the head and prothorax, the present species has a much shorter hind body than the Florissant *O. (?) duratus*, which has a similar, though not identical type of sculpture. Quite probably the two are congeneric, even if not truly belonging to *Oligomerus*.

LACHNOSTERNA (?) EXTINCTA sp. nov.

(Plate I, fig. 5).

Represented by a wing cover only, in good preservation. It is very finely and deeply but sparsely and somewhat irregularly punctured, the punctures partially outlining four smoother areas which correspond to the costae seen on the elytra of many recent *Lachnosterna*. Along the sutural margin is a strong stria while the outer margin towards the apex has a much less

pronounced mark of the same character. Length, 15.65 mm.; width, at basal third, 6.30 mm.

Described from one specimen collected by one of the expeditions under Professor Cockerell, but without special designation of station. The type is in the Museum of the University of Colorado.

The generic reference is provisional. It is about the size of the recent *L. ulkei*, but the punctuation is sparser and a little more regular than that on any *Lachnosterna* with which I am acquainted.

SAPERDA FLORISSANTENSIS sp. nov.

(Plate IV, figs. 20, 21, 22, 23).

The specimen is so much crushed that the general form is obscured, but judging from the elytra it must have been somewhat less elongate than the recent American *S. calcarata*. Head not showing any details. Antennae preserved in part, the basal joint thick and heavy but as the base is hidden the relative length cannot be made out. Second joint very short, broader than long, third evidently but not greatly longer than the fourth, the three following subequal, none much enlarged apically nor hairy. Prothorax too poor for description. Legs moderately slender, the tarsus showing well on only one, which seems to belong to the middle pair. In this, the first and last joints are subequal in length, the second and third joints much shorter, the third moderately lobed. Elytron in good preservation, subparallel, about three and two-thirds times as long as the basal width, sculpture a coarse and close granulation or punctuation, heaviest just behind the base and fading out rather rapidly (though not to complete smoothness) at about the apical third. There is no visible color pattern. Length of elytron, 11.00 mm.; width across base, 3.00 mm.

Described from one specimen, with counterpart, collected by Mr. Geo. Wilson.

Compared with the three Florissant fossil forms of more or less similar size and relationships, this insect may be told from *Protoncideres primus* by the coarse elytral sculpture; from *Saperda submersa* by the lack of elytral band; while from *Parolamia rudis*, which seems to have been similarly sculptured, it separates by the smaller size and relatively more elongate elytra. In general, the structural and sculptural characters agree well with *Saperda*.

RHYNCHITES VULCAN sp. nov.

(Plate II, fig. 8).

Form, in profile, rather elongate. Head almost entirely covered up by a leg which is folded across it. Beak practically straight and equal, striate. Eye not large, circular or nearly so. Antennae long, inserted about the

middle of the beak, basal joints slender, club not compact, the two joints which show not broad. Prothorax very little arched along the back, surface shining with a few shallow punctures of small size which become more pronounced and rugose along each side near the middle of the hind margin. Elytra two and two-thirds times the prothoracic length, shining like the prothorax but not quite so strongly, showing only a few shallow punctures, clothed with rather short not very close fine hairs, no evidence of striae. Under side of body hardly visibly punctured even under high power. Legs long, distinctly hairy. Length, exclusive of rostrum, 4.00 mm.; of elytron, 2.85 mm.; of rostrum, 2.00 mm.

Described from one specimen.

Not much like any of the other Florissant Rhynchitids which approach it in size. *Auletes wymani* has strongly striate elytra, *A. florissantensis* is larger and differently sculptured. The species of *Docirhynchus* are differently proportioned. As matters stand, the only reasonable course seems to lie in describing this species as distinct and assigning it to a genus where, at any rate, it will not look much out of place.

RHYNCHITES LAMINARUM sp. nov.

(Plate II, fig. 7).

Form fairly elongate. Head long, tapering, shining, hardly perceptibly punctured, corrugate on the cheek behind the eye. Beak, measured from the eye, as long as the head and prothorax together and considerably more than half as long as the elytra, not tapering except at base, very slightly arcuate, apparently punctured. Eye small, circular. Antennae not displayed. Prothorax with moderately arched dorsum, surface shining, weakly and distantly punctured, the punctures rather fine. Elytra not strongly arched dorsally, with poorly marked striae of punctures. Underside vaguely roughened as if by large shallow punctures. Legs poorly shown, rather long. Length, excluding rostrum but measured from its basal constriction, 3.60 mm.; of beak, measured from front of eye, 1.50 mm.

Described from two specimens, one in lateral view the other exhibiting the dorsum.

The characters seem to be those of *Rhynchites* and this beetle is certainly different from any Florissant species placed in the Rhynchitidae by Scudder or myself. It is a good deal like the figure and description of *Apion smithii* from Florissant, but that insect is larger, with a relatively shorter beak. I am inclined to think that *Apion smithii* and *A. exanimale* are both Rhynchitids and that *Toxorhynchus minusculus*, the type of Scudder's genus, is an *Apion*.

EUGNAMPTIDEA ROBUSTA sp. nov.

(Plate II, figs. 11, 12).

Form stout. Head (probably unnaturally) sunken into the prothorax, the front finely and very sparsely punctured. Beak fairly thick, tip broken, upper surface with a well marked carina between two grooves. Eyes not defined. Antenna pretty long, though the point of insertion is not surely enough marked to allow of definite statements of relative length, club four jointed. The five joints preceding the club are not in very good condition but seem to be short, not much longer than wide, basal joints not well enough preserved for description. Prothorax about four-fifths as long as wide, not perceptibly narrowed anteriorly, disk deeply but not coarsely and rather sparsely punctured, the punctuation becoming decidedly coarser and closer laterally. Elytra striatopunctate, quite distinctly near the base but obsolete on the disk and towards the apex. Legs poorly preserved, front pair (at least) long, the anterior femur strongly punctured and margined by a bead on both edges. Length, from front margin of pronotum to elytral tip, 3.20 mm.

Described from one specimen.

Rhynchitid characters are seen in the straight antennae with narrow, loose club, the long legs and the elytral sculpture. None of Scudder's species are much like this beetle, which approximates, in antennal structure, *Eugnampsidea tertiaria* from these shales. That insect is smaller, differently sculptured and has more slender antennae.

APION FLORISSANTENSIS sp. nov.

(Plate II, fig. 9).

Form stout, moderately ventricose. Head of moderate size, fairly closely and closely punctured, beak, measured from the front of the eye, about one-fifth longer than the prothoracic dorsum, only very slightly curved, not tapering, more roughly sculptured than the head with coarse punctures which tend to become confluent longitudinally so as to form indistinct striae. Antennae not defined. Eye roughly subcircular, lenses large. Prothorax arched above, though not strongly, not far from twice as high as long, punctuation coarse and close, more pronounced than that of the head. Elytra with deep striae, about as wide as the interspaces, striae punctures strong, rounded, separated by approximately their own diameters. Body beneath coarsely and closely punctured, more weakly on the abdomen. Legs fairly stout and not much elongate, femora not strongly thickened. Length, from pronotal front margin to elytral apex, 1.55 mm.; of head and rostrum, .75 mm.

Described from one specimen with counterpart.

Its minute size easily distinguishes this weevil from any of the other Florissant fossil species except *A. pumilum*. From that insect, it differs in having a much shorter head and by the pro-

thorax being more cuneate in side view. The sculpture seems to be about the same in both. In the present specimen there is still evidence of fine pubescence on the elytra, while the front and middle tibiae are closely clothed with minute hairs, directed longitudinally. All the femora are transversely finely wrinkled or striate, those of the front and middle legs more plainly.

APION SCUDDERIANUM sp. nov.

(Plate III, fig. 17).

Form fairly elongate, back not much arched except posteriorly. Head, measured from the front of the eye, more than two-thirds the length of the prothorax, strongly tapering, moderately coarsely and, in general, closely but not quite regularly punctate above the eye, finely striate beneath. Beak, measured from the same place, only a trifle longer than the prothorax, not tapering, except near the tip, regularly and gently curved, almost perfectly smooth. Eye elliptical, a little oblique, not very distant from the front margin of the prothorax. Antennae not defined except what is probably a bent portion of the scape lying upon the beak. Prothorax about one and two-thirds times as high as long, moderately tapering anteriorly, back pretty strongly and regularly arched, punctuation deep, moderately coarse, close and regular. Elytra not strongly convex on the dorsum except near the apex, striae deep, barely visibly punctate basally, interspaces hardly wider than the striae, transversely a little wrinkled. Sculpture of the underside weak. Legs not shown except one fore femur which is long and moderately stout but is not included in the figure. Length, exclusive of rostrum, 2.80 mm.

Described from one specimen with counterpart.

By the description and figure, this would come close to *Apion refrenatum* from the Florissant shales, but the present species is larger, has a much shorter beak and elliptical instead of circular eyes. The two short intermediate abdominal segments show very distinctly and have influenced my generic assignment.

CEUTORHYNCHUS BLAISDELLI sp. nov.

(Plate III, fig. 15).

Form moderately robust. Back, in side view, not strongly arched. Head with ill defined sculpture. Beak fairly stout, curved, about equal in length to the head and prothorax united, distinctly but finely striate and punctate. Eyes small, rounded. Prothorax about two-thirds as long as high, tapering anteriorly, without defined tubercles or spines, surface uniformly moderately coarsely cribrately punctured. Elytra subtruncate at apex, deeply striate, each stria with a row of small, well separated, rounded punctures, interstitial areas convex, each with about sixteen tubercles, low and flat near the elytral base but high and pointed apically. These tubercles are nearly

or quite coincident with the striae punctures in regard to number and spacing. Thoracic side pieces strongly, deeply and confluent punctured, metasternum a little less coarsely and much more sparsely. Abdominal punctures at base a little smaller, shallower and sparser than those of the metasternum, those of the apical segments apparently nearly obliterated. Legs of moderate length, the femora all distinctly punctured. Length, from base of beak to elytral apex, 2.20 mm.

Described from one specimen with counterpart.

Smaller than any of the Florissant fossil species described by Scudder and of totally different sculpture, which is of a type found in the recent group containing *C. hornii*, *C. nodipennis* and *C. adjunctus*, all from California, Utah and Nevada. I do not find evidence of scales upon the fossil and it may have been nearly glabrous like the first of the above species. The lateral tubercles were probably blunt or small since no indications of them remain.

The name is given for my friend Dr. Frank E. Blaisdell Sr., of San Francisco, well known for his work on the American Tenebrionidae.

BARIS ANTEDILUVIANA sp. nov.

(Plate IV, figs. 24, 25).

Form stout, oval. Head rather small, closely and fairly coarsely but not deeply punctured. Rostrum gently curved, equal in length to the prothorax, punctate about like the head and striate. Eye of good size, higher than long. Antennae not defined. Prothorax nearly twice as high as long, strongly tapering anteriorly and with well defined collar, back well arched, punctuation a little coarser than on the head, deep and close, each puncture with a small central mark which may be due to a scale. Elytra arched, strongly striate, the striae separated by about twice their own width, each with a row of more or less circular or slightly elongate punctures which are fairly deep and separated by approximately their own longitudinal diameters, interspaces not punctured. Metasternum punctured almost exactly like the prothorax, the abdomen much less strongly and deeply. Legs of moderate length, not very well preserved except one belonging to the front pair which has a broad femur and very slightly curved tibia, the latter rather coarsely punctured. Length, excluding rostrum, 2.50 mm.

Described from one specimen with counterpart.

In size, this is pretty close to several other Florissant Barids, but may be distinguished from all which approach it in this respect by the combination of characters shown in the relative length and height of the body, the strongly tapering and heavily punctured prothorax and the nature of the striation and punctation of the elytra.

As the outline drawing is made from the slab which does not properly show the shape of the fore leg, a detail figure is given to illustrate this character.

BARIS RENOVATA sp. nov.

(Plate IV, fig. 19).

Form rather stout. Head unnaturally extended in flattening, so as to appear larger than normal, occiput (probably where overlapped in life by the pronotum) extremely minutely longitudinally closely rugose by confluence of the fine punctuation, vertex moderately coarsely, strongly and very closely punctured. Eye rather large, circular. Beak with outline poorly defined, sculptured a little more finely than the vertex, the punctures tending to become longitudinally confluent. Pronotum not much arched, punctuation coarse, moderately deep and as close as possible without confluence. Elytra but little arched along the back, with rows of moderately deep and large rounded punctures, each of which bears a short bristle or hair-like scale, the areas between the rows about smooth. Body beneath punctured in a manner similar to that of the pronotum except that there is a smooth area between the middle and hind coxae and the abdominal sculpture is less deep than that of the prothorax. Legs fairly stout and of moderate length. Length, exclusive of rostrum, 2.10 mm.

Described from two specimens with their counterparts.

This is referred to *Baris* in the wide sense because I am not able to assign it to any of the modern genera created by the dismemberment of the old group and at the same time no characters seem to offer themselves for the establishment of a new genus. Its form is very much that of some of the recent species of *Limnobaris* but the sculpture and vestiture are more like *Pachybaris porosus*. The abdomen is damaged so that the sutures are neither fully displayed nor distinct, but the pygidium seems to have been exposed. None of the other Florissant Barini are so small as this fossil which is unique, also, in punctuation and vestiture. The hairs are visible only in certain lights and must be sought for carefully under fairly high magnifying power.

BARIS NEARCTICA sp. nov.

(Plate IV, fig. 18).

Form rather elongate, subparallel. Head strongly and closely but rather finely punctured, the beak somewhat less distinctly. Rostrum but very little curved, nearly as long as the prothorax. Eye small, elliptical, its long axis oblique to the head. Antenna not well defined, but the club is pretty distinct and is elongate oval, pointed at the tip. Prothorax very deeply punctured, more coarsely than the head, the punctures extremely close together but scarcely confluent, finer along the front margin. Elytra long,

two and two-thirds times the length of the prothorax, punctatostriate, the rows of punctures as wide or wider than the interstitial spaces which are convex and extremely minutely punctulate. The striae punctures are circular or a little elongate, very deep and separated in general by less than their own diameters. Thoracic side pieces and metasternum a little less strongly punctured than the pronotum. Abdomen not displayed. Legs rather long, closely but not very strongly nor coarsely punctate on the femora and tibiae, none of which seem to be armed. Length, exclusive of rostrum, 4.50 mm.

Described from one specimen.

A baride weevil, more elongate than usual with *Baris* proper and reminding one, by its form, coarse sculpture and antenna, of the recent *Onychobaris mystica* from Utah and Arizona. It is apparently not like any of the Florissant weevils described by Scudder but approaches in size three of the fossil Barids which I have characterized. From *B. florissantensis* it differs in being much more coarsely punctured and in lacking distinct transverse markings on the elytral interspaces; from *B. cremastorhynchoides* in the very much larger elytral punctures which are nearly or quite as wide as the interstitial spaces, while in *B. cremastorhynchoides* the rows are separated by twice their own diameters, more or less; and from *B. schucherti* in the rows of elytral punctures being much more closely approximated so that the interspaces are narrower.

MIOGERAEUS gen. nov.

Body similar in form to *Geraeus*. Eye circular or nearly so. Intermediate abdominal segments short, sutures straight. Elytral striae largely confluent at base.

Type. *M. recurrens* sp. nov.

MIOGERAEUS RECURRENS sp. nov.

(Plate III, fig. 14).

Preserved in side view. Body stout, oval. Head, as preserved, sunken into the prothorax so as partially to obscure the eye, punctuation strong, extremely close and moderately coarse, but not confluent. Beak, measured from the eye, longer than the prothorax, base punctured like the head, tip more finely, in outline gently curved, nearly equal in diameter from the base to about the apex. Antennal scrobe well marked, antenna not preserved except a portion of the base. Prothorax about one and two-thirds times as high as long, strongly tapering to apex and with some evidence of a smooth collar, surface more coarsely punctured than the head but in similar fashion, dorsum gently arcuate. Prosternum with two short horns as in many modern males of *Geraeus*. Elytra moderately arched dorsally,

apex (judging from the striae) broken off, striae extensively confluent basally (though less deep in this region) as shown in the figure, moderately deep and narrow, sparsely punctate at bottom, the punctures small and nearly round, interspaces broad, flat, nearly smooth except near the base where they are somewhat wrinkled transversely or imbricately sculptured. Under side of body punctate similarly to the prothorax except that the abdominal sculpture is a little finer on the proximal segments and much more so on the distal ones. Legs in poor condition, moderately long. Length, excluding rostrum, 3.15 mm.

Described from one specimen.

Remarkable as showing the prosternal horns so characteristic of male *Geraeus* today. In this species they are shorter than in the majority of the Mexican forms figured by Mr. Champion but are pretty nearly in the same stage of development as in *G. marginatus*. I have felt obliged to separate the fossil under a new generic name on account of the peculiar elytral striation which I do not find paralleled in any of the Barini at my disposal. The appearance is almost as if the elytron had been turned end for end, but I cannot believe that such an accident could happen without leaving evidence of dislocation. I have made no account of the spur-like process on the front edge of the prothorax under the eye, not knowing whether it is adventitious or otherwise. It does not look like the sternal spurs. Compared with Florissant fossil Barini, this would approach in size *Catobaris coenosa*, which has longer legs, and *Aulobaris damnata* which has a shorter beak. Both are entirely different in elytral sculpture.

CENTRINUS HYPOGAEUS sp. nov.

(Plate III, fig. 13).

Form stout, outline, in side view, oval. Head strongly, closely and fairly coarsely punctate on the vertex, cheeks very finely corrugated. Beak, measured from the eye, a little longer than the prothorax, gently curved, finely striate, otherwise nearly smooth. Eye elliptical. Antennae too poorly shown for description. Prothorax hardly arched along the back, strongly tapering anteriorly, punctuation regular, somewhat coarser than on the head, close and strong, each puncture roughened at bottom, possibly by the presence of a scale. Elytra regularly and fairly deeply striate, the striae with distinct, but not very strong, subcircular, well separated punctures, interstitial spaces broad, flat, about twice as wide as the striae. The elytra appear to have been covered with a moderately close, fine, hair-like vestiture. Sterna sculptured about like the prothorax but perhaps a little more coarsely, punctuation of the abdomen similar at base becoming finer

apically. Legs of moderate length, finely roughened, possibly by hair marks. Length, exclusive of rostrum, 3.00 mm.

Described from one specimen with counterpart.

By all the visible characters, this seems to be a good *Centrinus*. The elytral striation will separate it at once from *Miogeræus*, while the longer beak and different form of body will distinguish it from *Aulobaris damnata*. It is not especially likely to be mistaken for any of the other Florissant fossils.

PITYOPHTHORIDEA gen. nov.

A name proposed for a fossil insect of the same general form as the recent *Pityophthorus* and with similar sculpture but having the intermediate abdominal segments less shortened.

Type. *P. diluvialis* sp. nov.

PITYOPHTHORIDEA DILUVIALIS sp. nov.

(Plate IV, figs. 27, 28).

Form moderately elongate, nearly parallel. Head crushed and partly obliterated. Prothorax projecting over the head, dorsum a little arched and with about six transverse rows of asperities which look like the raised edges of large subconfluent punctures. Elytron about one and two-thirds times the length of the prothorax, with rows of punctures not very well preserved but evidently large and only fairly deep. Legs short, rather stout. Length, from front margin of prothorax to elytral apex, 2.40 mm.

Described from one specimen, with counterpart.

Looks very much like a *Pityophthorus*, but is shorter and stouter than the average in this genus. The print on one slab shows a portion of the abdomen very well and it is on account of the somewhat greater length of the intermediate segments that I have proposed a new generic name.

ADIPOCEPHALUS gen. nov.

This name is proposed for an insect probably belonging to the tribe Scolytini, by the ascending ventral surface of the abdomen, but with an enormous head which approximates the prothorax in size. The hind tibiae (at least) are broad and flat, femora stout. Body sculpture rough. The eye is not definable in entirety, but what shows of the upper margin indicates that it is broader and shorter than in the modern *Scolytus*. In general, the abdominal segmentation agrees with that genus but the surface was probably less strongly ascending in the fossil.

Type. *A. hydropicus* sp. nov.

ADIPOCEPHALUS HYDROPICUS sp. nov.

(Plate II, fig. 10).

Preserved in lateral view. Form stout, subparallel. Head extremely

large, almost as high as the prothorax and about two-thirds as long, vertex sloping into the front with a gentle curve. Cephalic punctuation minute but distinct and pretty regular, genae vertically finely rugose. Antennae obscured. Eye not fully definable. Prothorax subcuneate in side view, back scarcely arched, surface finely granulate on the disk, becoming closely, moderately coarsely and rather deeply punctate on the lower portions of the sides where the punctures tend to form vertical rows. There are no thoracic asperities. Elytra rather badly broken on the outer edge and probably with the sutural margin also wanting, but what remains shows the sculpture very well. This consists of moderately deep wide striae, coarsely but not very deeply punctate, the punctures nearly approximate. Interspaces broad, nearly flat, finely roughened. Metasternal area and base of abdomen closely and not deeply punctured, these punctures somewhat smaller and much less distinct than on the prothoracic flank. Legs short, stout. Length, 2.85 mm.

Described from one specimen.

A well preserved little insect which separates at once from all Florissant fossils of somewhat similar form and size by the combination of large head, short prothorax and strong sculpture.

PHLOEOTRIBUS ZIMMERMANNI sp. nov.

(Plate III, fig. 16).

Form elongate, nearly parallel. Head wanting except a small portion in poor condition. Prothorax strongly rounded anteriorly, subparallel behind, base almost rectilinear, surface roughly and rather irregularly punctured, the anterior edges of the punctures toward the front and sides strongly raised so as to form distinct asperities. Elytra imperfect as to outline, basal margin raised and serrate, each with seven rows of deep circular punctures which are pretty closely approximated longitudinally and wider than the rather shallow striae. Interspaces not quite equal in width, but broader than the diameter of the punctures, asperate like the prothorax though not quite so strongly, the asperities becoming lower and more transverse as they approach the elytral apex. Length, as preserved, 3.00 mm.

Described from one specimen.

In those characters which can be determined this insect approaches very closely to the recent genera *Phloeotribus*, *Phloeosinus* and *Polygraphus*, but I have finally decided to refer it to the first of these on account of its general similarity in sculpture to the modern *Phloeotribus frontalis*, found in the eastern half of the United States. The outer elytral edge is almost certainly broken off, so that I am unable to say whether or not it is serrate.

The name is given in memory of Christoph Zimmermann, an early and industrious student of American Scolytidae.

EXPLANATION OF PLATES

Plate I.

- Fig. 1. *Cryptophagus petricola*.
 Fig. 2. *Cryptophagus petricola*, antenna.
 Fig. 3. *Miophenolia cilipes*, underside.
 Fig. 4. *Tritoma petrefacta*, underside.
 Fig. 5. *Lachnosterna extincta*.
 Fig. 6. *Oligomerus brevisculus*, underside.

Plate II.

- Fig. 7. *Rhynchites laminarum*.
 Fig. 8. *Rhynchites vulcan*.
 Fig. 9. *Apion florissantensis*.
 Fig. 10. *Adipocephalus hydropicus*.
 Fig. 11. *Eugnamptidea robusta*.
 Fig. 12. *Eugnamptidea robusta*, antenna.

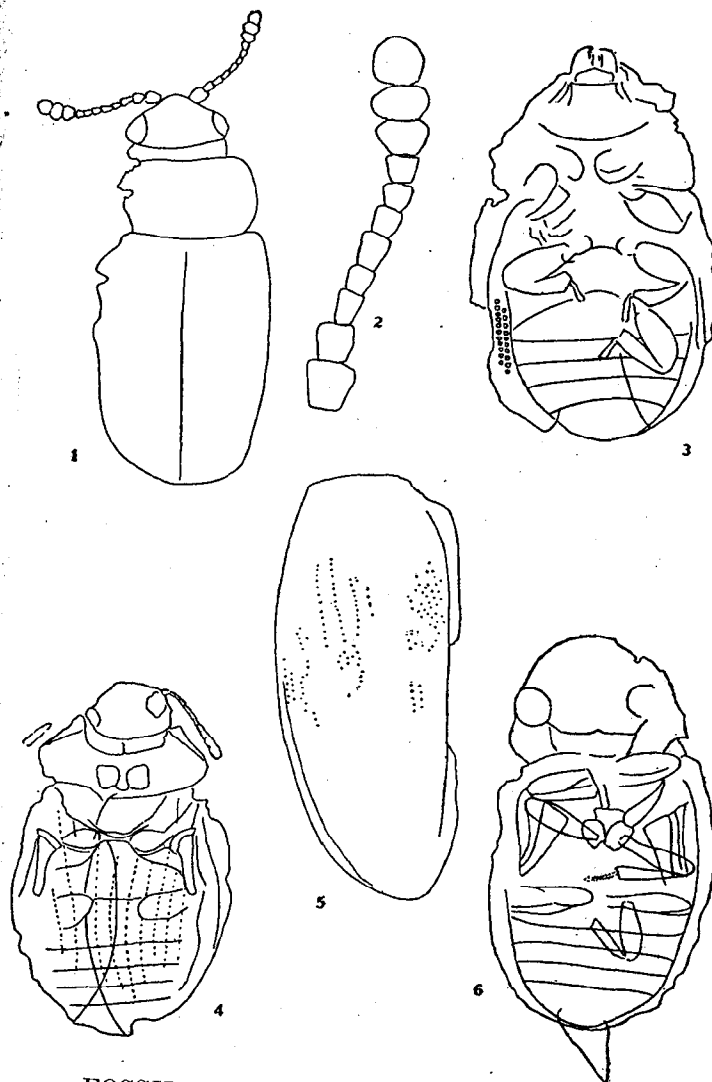
Plate III.

- Fig. 13. *Centrinus hypogaeus*.
 Fig. 14. *Miogeracius recurrens*.
 Fig. 15. *Centorhynchus blaisdelli*.
 Fig. 16. *Phloeotribus zimmermanni*.
 Fig. 17. *Apion scudderianum*.

Plate IV.

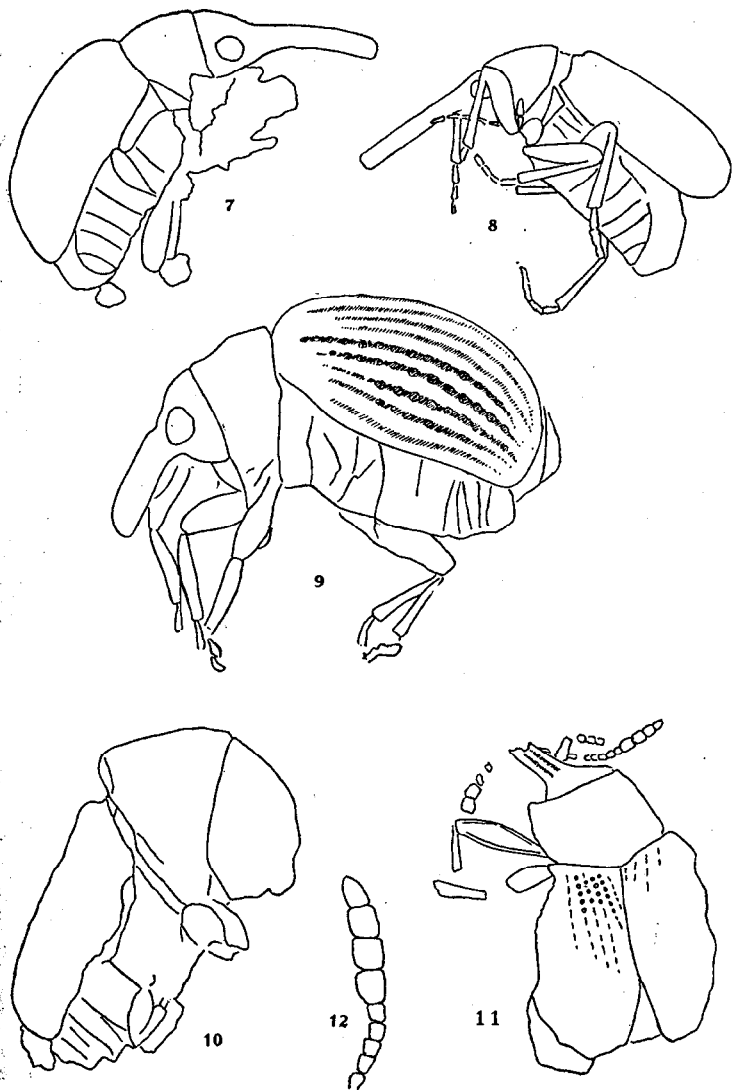
- Fig. 18. *Baris nearctica*.
 Fig. 19. *Baris renovata*.
 Fig. 20. *Saperda florissantensis*, elytron.
 Fig. 21. *Saperda florissantensis*, leg.
 Fig. 22. *Saperda florissantensis*, antennae.
 Fig. 23. *Saperda florissantensis*, middle(?) tarsus.
 Fig. 24. *Baris antediluviana*.
 Fig. 25. *Baris antediluviana*, fore leg.
 Fig. 26. *Malachius pristinus*.
 Fig. 27. *Pityophthoridae diluvialis*.
 Fig. 28. *Pityophthoridae diluvialis*, abdomen and hind leg.

PLATE I



FOSSIL COLEOPTERA FROM FLORISSANT

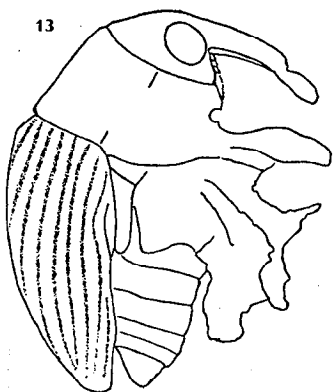
PLATE II



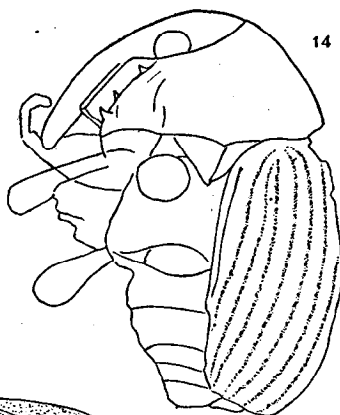
FOSSIL COLEOPTERA FROM FLORISSANT

PLATE III

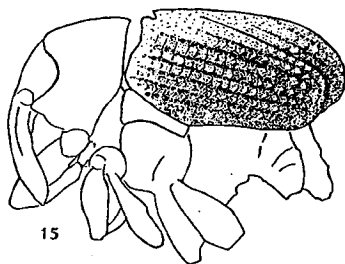
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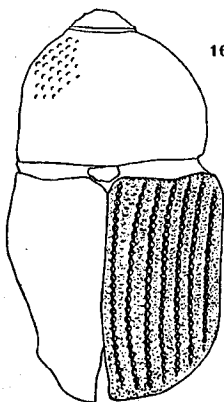
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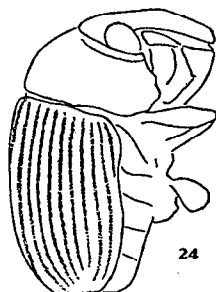
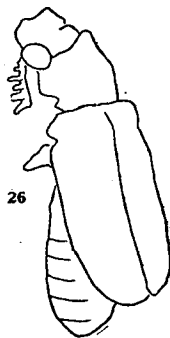
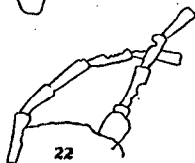
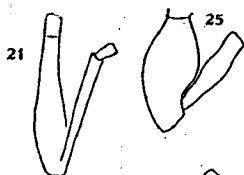
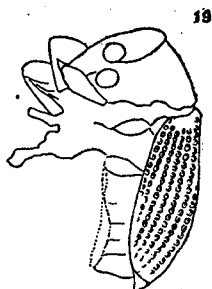


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FOSSIL COLEOPTERA FROM FLORISSANT

PLATE IV



FOSSIL COLEOPTERA FROM FLORISSANT